WHAT IS CLAIMED:

1. A space-based power system, comprising:

a plurality of power system elements in space; and

a control system, wherein

one or more of the elements of the plurality of elements are free-floating, and the plurality of elements are arranged to collect sunlight, generate electrical energy from the collected sunlight, and convert the electrical energy into a form for transmission to a pre-determined location, and

the control system maintains alignment of the free-floating elements.

2. The system of claim 1, the plurality of elements including a mirror.

3. The system of claim 2, the mirror comprising a foldable mirror.

4. The system of claim 2, the mirror comprising a spherical mirror.

5. The system of claim 2, the mirror having a diameter of about 1km to about 2km.

6. The system of claim 2, the mirror being supported by an inflatable tube.

7. The system of claim 2, the mirror including a substrate and an optical coating.

8. The system of claim 7, wherein the optical coating reduces photon pressure on the mirror.

9. The system of claim 7, wherein the optical coating maintains a shape of the mirror.

10. The system of claim 2, the mirror being supported by a membrane.

11. The system of claim 1, the predetermined location comprising a planet.

12. The system of claim 11, the planet comprising Earth.

13. The system of claim 1, the predetermined location comprising a space station or a satellite.

14. The system of claim 1, the plurality of elements including:

a primary mirror;

a first intermediate mirror, wherein the primary mirror reflects sunlight to the intermediate mirror;

a power module, wherein the first intermediate mirror directs sunlight to the power module, and the power module generates electrical energy;

an emitter; and

a reflective mirror,

wherein the emitter converts the generated electrical energy into a form that can be transmitted, and the converted energy is provided to the reflective mirror, wherein the reflective mirror is configured to transmit the converted energy to a receiver at the predetermined location.

15. The system of claim 14, further comprising a second intermediate mirror wherein the converted energy is provided to the second intermediate mirror, and the second intermediate mirror reflects the converted energy to the reflecting mirror.

16. The system of claim 14, further comprising a second intermediate mirror, wherein the primary mirror reflects sunlight to the first intermediate mirror, and the first intermediate mirror reflects the sunlight to the second intermediate mirror, and the second intermediate mirror reflects sunlight to the power module.

17. The system of claim 14, further comprising a concentrator, the concentrator focusing the sunlight from the intermediate mirror onto the power module.

18. The system of claim 14, wherein the intermediate mirror tracks the orientation of the primary mirror so that the intermediate and primary mirrors remain aligned with each other and the sun.

19. The system of claim 14, wherein the power module generates direct current electricity.

20. The system of claim 14, the power module comprising a photovoltaic module.

21. The system of claim 20, wherein solar cells of the photovoltaic module are co-located with the emitter.

22. The system of claim 14, the power module comprising a thermoelectric power module.

23. The system of claim 14, wherein the reflecting mirror is about the same size as the primary mirror.

24. The system of claim 14, the converted energy reflected by the reflecting mirror being focused on an antenna at the predetermined location.

25. The system of claim 1, wherein the converted energy is transmitted as a diffraction-limited beam.

26. The system of claim 1, wherein the converted energy comprises radio frequency energy.

27. The system of claim 1, wherein the converted energy comprises optical energy.

28. The system of claim 1, wherein the control system adjusts a position of an element.

29. The system of claim 1, wherein the control system adjusts an orientation of an element.

30. The system of claim 1, wherein the control system adjusts a shape of an element.

31. The system of claim 1, wherein the control system maintains the alignment of all of the plurality of elements.

32. The system of claim 1, wherein the control system is located in space.

33. The system of claim 30, wherein the control system is located on Earth.

34. The system of claim 1, wherein the control system includes a displacement element, and the displacement element is selectively activated to adjust an alignment of an element in space.

35. The system of claim 34, the displacement element comprising a thruster.

36. The system of claim 35, the thruster comprising an ion thruster.

37. The system of claim 34, each element in space having a displacement element.

38. The system of claim 34, wherein the displacement element alters a position of an element in space.

39. The system of claim 34, wherein the displacement element alters an alignment of an element in space.

40. The system of claim 1, wherein the control system includes a plurality of sensors, wherein data of sensors of two elements is compared to determine whether the two elements are properly aligned.

41. The system of claim 40, wherein sensors of adjacent elements are arranged to communicate with each other.

42. The system of claim 40, wherein each element includes a positioning system sensor.

43. The system of claim 1, wherein the control system includes a plurality of distance sensors, wherein data from the distance sensors indicates a distance between two elements.

44. The system of claim 43, wherein each element includes a distance sensor.

45. The system of claim 1, the control system utilizing radar or lidar.

46. The system of claim 1, the control system utilizing an interference pattern to determine whether an element should be re-aligned.

47. The system of claim 1, wherein the elements are configured so that a solar wind adjusts the alignment of the elements.

48. The system of claim 1, wherein the elements are configured so that an electro-static force adjusts the alignment of the elements.

49. The system of claim 1, wherein the elements are maintained in an orbit.

50. The system of claim 1, the plurality of elements including a direct radiating array or phased array antenna, the antenna transmitting the electrical energy to the predetermined location.

51. The system of claim 1, wherein a majority of the elements of the plurality of elements are free-floating in space.

52. The system of claim 1, wherein all of the elements of the plurality of elements are free-floating in space.

53. A space-based power system, comprising:

a plurality of power system elements in space, the plurality of elements including:

a primary mirror;

an intermediate mirror, wherein the primary mirror directs sunlight to the intermediate mirror;

a power module, wherein the intermediate mirror directs sunlight to the power module, the power module generating direct current electricity;

an emitter, wherein the emitter converts the direct current electricity into RF or optical energy; and

a reflective mirror, wherein the emitter directs the RF or optical energy to the reflective mirror, and the reflective mirror directs the RF or optical energy to a receiver at a predetermined location; and

a control system, the control system including:

a plurality of sensors, and

a plurality of displacement members,

wherein one or more elements of the plurality of elements are free-floating, each element in space includes a sensor and a displacement element, and the control system maintains alignment of the free-floating elements in space by selectively activating a displacement member in response to sensor data.

54. The system of claim 53, the power module comprising a photovoltaic module.

55. The system of claim 53, the power module comprising a thermoelectric power module.

56. The system of claim 53, the predetermined location comprising a planet.

57. The system of claim 53, the predetermined location comprising a space station.

58. The system of claim 53, the predetermined location comprising a satellite.

59. The system of claim 53, the power system elements further comprising a concentrator, the concentrator focusing the sunlight from the intermediate mirror onto the photovoltaic module.

60. The system of claim 53, wherein the RF or optical energy is provided directly to the reflective mirror.

61. The system of claim 53, further comprising a second intermediate mirror, wherein the first intermediate mirror directs sunlight to the second intermediate mirror, and the second intermediate mirror directs the sunlight to the photovoltaic module.

62. The system of claim 53, wherein the generated reflecting mirror provides a diffraction-limited beam.

63. The system of claim 53, the optical power reflected by the reflecting mirror being focused on an antenna at the predetermined location.

64. The system of claim 53, wherein the control system adjusts a position of an element in space.

65. The system of claim 53, wherein the control system adjusts an orientation of an element in space.

66. The system of claim 53, wherein the control system adjusts a shape of an element in space.

67. The system of claim 53, wherein the control system maintains the alignment of all of the plurality of elements in space.

68. The system of claim 53, wherein the control system adjusts a shape of an element.

69. The system of claim 53, wherein the control system is located in space.

70. The system of claim 69, wherein the control system is located on Earth.

71. The system of claim 53, the displacement element comprising a thruster.

72. The system of claim 71, the thruster comprising an ion thruster.

73. The system of claim 53, wherein data of sensors of two elements in space is compared to determine whether the two elements are properly aligned.

74. The system of claim 53, wherein the control system includes a plurality of distance sensors, wherein data from the distance sensors indicates a distance between two elements in space.

75. The system of claim 53, the control system utilizing radar or lidar.

76. The system of claim 53, the control system utilizing an interference pattern to determine whether an element in space should be re-aligned.

77. The system of claim 53, wherein the elements in space are configured so that a solar wind adjusts the alignment of the elements.

78. The system of claim 53, wherein the elements in space are configured so that an electro-static force adjusts the alignment of the elements.

79. The system of claim 53, wherein the elements in space are maintained in an orbit.

80. The system of claim 53, the power module comprising a photovoltaic module.

81. The system of claim 53, the power module comprising a thermoelectric power module.

82. The system of claim 53, the plurality of elements including a direct radiating array or phased array antenna, the antenna transmitting the electrical energy to the predetermined location.

83. The system of claim 53, wherein a majority of the elements of the plurality of elements are free-floating in space.

84. The system of claim 53, wherein all of the elements of the plurality of elements are free-floating in space.

85. A method of aligning power system elements to generate power in space and transmit the generated power to a predetermined location, the method comprising:

launching a plurality of elements and a control system into space, wherein one or more elements of the plurality of elements are free-floating in space;

positioning the elements in space; and

maintaining alignment of the free-floating elements using the control system so that the power system elements are configured to:

collect sunlight;

generate electrical energy from the collected sunlight, and convert the electrical energy into a form suitable for transmission to the pre-determined location.

86. The method of claim 85, maintaining alignment further comprising adjusting an orientation of an element.

87. The method of claim 85, maintaining alignment further comprising adjusting a shape of an element.

88. The method of claim 85, maintaining alignment further comprising adjusting a position of an element.

89. The method of claim 85, maintaining alignment further comprising activating a thruster to adjust an alignment of a power element.

90. The method of claim 85, maintaining alignment further comprising maintaining alignment using radar or lidar.

91. The method of claim 85, maintaining alignment further comprising utilizing a laser interference pattern to determine whether an element should be re-aligned.

92. The method of claim 85, wherein a majority of the elements of the plurality of elements are free-floating in space.

93. The system of claim 85, wherein all of the elements of the plurality of elements are free-floating in space.